surprise to those who were concerned in that Commission work. Roughly, it may be said that the Commission values obtained in the course of a month or two by the method referred to are in excess of those now fixed by about two seconds of arc both in latitude and in longitude, a displacement which has no effect whatever on the validity of that international boundary which was then demarcated.

This is not unimportant, for it need be no longer a political secret that the adoption of the crest of the Nicolas range as the boundary in question depended on the fact that no part of it was north of the latitude of Lake Victoria. The Russians, by astronomical deduction, maintained that it did in fact bulge over that parallel, but the results of the Pamir triangulation, based on those mighty peaks which were visible from certain high altitudes overlooking the Hindu Kush, combined with astronomical determinations for latitude of the British surveyors, afforded too strong an argument to be refuted, and the range was adopted. It is therefore satisfactory to find (not that the matter was ever really in doubt) that the range is, so to speak, in its right place. These results do also suggest that more use might be made of the system of interpolation. The British officers who have been triangulating across the backbone of the Andine Cordillera in Peru have indeed made use of it, and that must have been just about the same time that Lieut. Mason's party was pushing its way through the Hunza defiles.

T. H. HOLDICH.

MR. BEDFORD MCNEILL.

It is with regret that we announce the death on September 18, due to cerebral hæmorrhage, of Mr. Bedford McNeill, the well-known mining engineer, at fifty-five years of age. Apart from his high reputation as a mining engineer, Mr. McNeill's name was almost a household word in connection with the telegraphic code compiled by him, which was issued originally in 1893, and in an enlarged and revised form in 1908. This code is employed almost without exception by mining companies and engineers, to whose use it was specially dedicated, and other business men have found it extremely practical for cable communications.

As a mining engineer Mr. McNeill graduated at the Royal School of Mines in 1880, when the school was still in Jermyn Street; and his professional career as consulting engineer, which began in the office of the late Mr. John Darlington, took him into many parts of the world. He was a member of many learned societies, including the Institute of Chemistry, the Geological Society, of which he was also a Member of Council and Treasurer for some years, and the Iron and Steel Institute. In 1895 Mr. McNeill was elected a member of the Institution of Mining and Metallurgy, of which he soon afterwards became vice-president, and he occupied the presidential chair in 1913–14. His inaugural address in that capacity dealt with the present and future problems confronting the mining profession, particularly as regards the speculative nature of mining and its close association with capital. He pointed out that mining was likely to become more speculative in its character in the future, since, though there were still large areas not yet properly prospected, the engineer may ultimately be driven to working that class of mineral occurrence which presents no visible evidence whatever at surface, and the location and working of which will inevitably demand higher technical skill and involve greater risk of loss of capital than those deposits at present dealt with. During Mr. McNeill's term of office the Institution of Mining and Metallurgy acquired its freehold house at No. 1 Finsbury Circus, which was formally opened on January 13, 1914, by the Lord Mayor of London, and during his presidency also the first steps were taken for securing the Royal Charter which has since been granted to the institution. His connection with the Royal School of Mines was maintained throughout his career.

Mr. McNeill was buried at Hollington, West St. Leonards, on September 21. The following societies were officially represented at the funeral:—The Institution of Mining and Metallurgy, the Royal School of Mines Advisory Board, the Mining Committee of the Advisory Council for Scientific and Industrial Research, the Geological Society, the Royal School of Mines, the R.S.M. Old Students' Association, and the Mining and Metallurgical Club, of which he was vice-president, while floral tributes were sent by the Institute of Chemistry, the Iron and Steel Institute, etc. Mr. McNeill's death creates a gap in the mining and kindred professions that will be difficult to fill.

NOTES.

AN account of a new means of delineating internal organs *in vivo*, and the localisation of injuries to them, by an electrical method devised by James Shearer, M.D. (Washington, D.C.), at present a sergeant in the R.A.M.C., is given in the *British Medical Journal* for September 30. It is difficult to realise from the description the exact nature of the electrical installation used, but the principle is said to be to impose upon two alternating electric fields of equal strength at right angles the effect of a third field having its origin in the organ under examination. The patient lies on an insulated table, and near him are placed two screens of perforated zinc plate, one horizontal and the other vertical, connected to two separate batteries. A sheet of waxed paper is then put upon a cylinder which is set in rapid rotation, and a needle scribes upon this paper a tracing of the organ under examination, showing at the same time any lesions in it. Prints can afterwards be taken from the record by contact printing with photographic paper. Five illustrations are given in the *British Medical Journal* showing respectively pictures of the brain, kidney, cæcum and appendix, intestine, and liver of injured patients submitted to the process. The brain picture is as clear a delineation of the blood-vessels as is given in text-books of anatomy, but how it could possibly have been produced by a tapping needle upon a rapidly revolving cylinder cannot readily be conceived. Without further details to enable electro-physiologists to repeat Sergeant Shearer's work it is impossible to say more than that the results, if confirmed, represent a very remarkable discovery, which may be of immense advantage in delineating the soft internal structures of the body. So many inventions at first received with incredulity have turned out to be truly useful that we hesitate to speak of this present one as incredible. But with the imperfect details and explanation which are as yet forthcoming, we may be excused if we adopt the attitude of scientific expectancy. We trust it will not be long before the new method is examined by proper experts, and its scientific soundness properly investigated.

AT 3 a.m. (Summer Time) on Sunday last, October 1, Greenwich Time again became the standard time of Great Britain. By an order issued by the Home Office, "the hour 2–3 a.m. Summer Time" was followed by "the hour 2–3 a.m. Greenwich Time." All railway clocks and clocks in post offices and Government establishments were put back one hour, and the Government requested the public to put back the time of all clocks and watches by one hour during the night of Saturday-Sunday, September 30-October 1. From October 1 onwards Greenwich Time will be used for all purposes instead of being limited to the needs of navigation, astronomy, and meteorology, as it has been since May 21. It is announced that the Home Secretary, while satisfied with the results of the Summer Time Act, has appointed a committee to consider the question in all its aspects. A Daylight Saving Bill will probably be reintroduced next year, but Mr. Samuel thinks that certain objections, coming chiefly from northern manufacturing districts, and a number of suggestions and recommendations should be inquired into first. The late experience has shown that the State need not hesitate to introduce any changes which are believed to be for the good of the community. In NATURE of September 28 a correspondent suggested certain modifications of the customary use of a.m. and p.m., so as to avoid the designation of half an hour after midday by 12.30 p.m., while 11.30 p.m. occurs eleven hours later. Mr. C. T. Whitmell writes to say that he made the same suggestion in the *Yorkshire Post* of August 4, and remarks that "some definite agreement as to the way of representing the times between noon and 1 p.m. and between midnight and 1 a.m. is certainly desirable." The Home Secretary's committee might consider this matter, and also the question of designating hours from 0 to 24, so as to avoid the use of a.m. and p.m. altogether.

MR. BENJAMIN KIDD, the author of important books and articles in which a system of social philosophy is developed from an original point of view, died on October 2, at fifty-eight years of age. His first work, "Social Evolution," is the best known, and when it was published in 1894 its originality and force were recognised immediately. The keynote of the work was the declaration that religion is not the enemy of science and enlightenment, but, on the contrary, through the ethical principles of its teaching, has been one of the most important agencies in social development, and is closely bound up with that portion of our nature to which all modern social advance is due, and by which the course of future progress will be decided. Mr. Kidd thus found the causes of the evolution of society and of modern civilisation, not in the growth of intellect and of science, but in the continuous action of religious beliefs. In 1898 was published his book, "The Control of the Tropics," which directed attention to the importance of the tropics in the development of civilisation; and in 1902 appeared his "Principles of Western Civilisation," which made "efficiency in the future" the determining quality of social development. This "projected efficiency," when "society, with all its interests in the present, is subordinated to its own future," was regarded as the secret of success and of progress, and its absence was the cause of stagnation. Mr. Kidd was also the author of other notable works. To the tenth edition of the "Encyclopædia Britannica" he contributed a prefatory article on "The Application of the Doctrine of Evolution to Sociological Theory," and for the eleventh edition he wrote the article on sociology. In 1908 he delivered the Herbert Spencer lecture at Oxford upon the subject of "Individualism and After."

A SKIEN newspaper announces the discovery in Telemark, Norway, of a rich mineral field covering several kilometres. Bismuth and silver have been found there, and it is said that there are traces of gold.

THE Faraday Society will hold a general discussion on "Refractories" at its first autumn meeting, the date of which is provisionally fixed for Wednesday, November 8. The discussion will be presided over by Sir Robert Hadfield, president of the society, and the opening paper will be read by Dr. J. W. Mellor.

A LECTURE on "Stresses in Transparent Materials as Revealed by Polarised Light" will be delivered by Prof. E. G. Coker before the Optical Society on Thursday next, October 12, at the rooms of the Chemical Society, Burlington House, Piccadilly, W.

ACCORDING to the *Times* a "meteorite (commonly known as a 'thunderbolt')" fell at Dinas Powis, near Cardiff, on the night of September 26–27, and did some damage. The cause of the damage was, however, not a meteorite, but a lightning-flash. There had been thunderstorms on or about the same day of the month in the previous May, June, and July, whilst it was on March 27 that the famous storm occurred.

MR. LLOYD GEORGE's allusion to the absence of the nightingale from Wales has caused a long and sharp discussion in the local Press. It is authoritatively stated that during the last thirty years the nightingale has been steadily moving westward in the Principality. In East Glamorgan it is a regular visitor, but has also been reported from Carmarthen, and was heard as far west as Aberystwyth in 1911.

A WIRELESS station has been established on Dickson Island, at the mouth of the Yenisei, by an expedition under the leadership of Dr. Kuchakov, for the purpose of sending meteorological telegrams to the physical observatory in Petrograd. The value of these telegrams will be felt chiefly in Siberia.

DURING the past summer a party of forty men, including five engineers, has been working the large coalfield on Bear Island, between Spitsbergen and Norway. The field has proved of greater extent than was anticipated, and the coal seams crop out on the north side of the island. A cargo has already been dispatched, and it is possible to continue the export throughout the year. The Norwegian Government proposes to establish wireless and meteorological stations there.

AT Leonardsberg, four kilometres from Norrköping, Sweden, there have recently been discovered and cleaned from the surrounding earth a number of rock-carvings, both large and small. One of them shows a row of human figures, among others women with children, men bearing shields, horses, and two other quadrupeds with curious head ornaments. Another interesting rock-carving has been discovered in Biskopskulla parish in Upland. Six previous carvings were known from this district, but the present one is the representation of a ship of a type hitherto unknown there, since it is not merely outlined but carved on the rock in low relief. About one metre long, it represents one of the so-called dragon ships, and belongs to the oldest group of such monuments of the Bronze age, a conclusion confirmed by its height of 32·5 metres above sea-level.

THE Y.M.C.A. is organising a series of microscopic exhibitions in the military and naval camps for the interest of the men in their leisure hours. An organising committee consisting of fellows and members of the Royal Microscopical Society, Quekett Microscopical Club, and the Photomicrographic Society has been formed, and already many fixtures have been made for exhibitions to be held in the Y.M.C.A. huts in various centres throughout the metropolitan area and the home counties. The exhibitions generally take place in the late afternoons or the evenings, and ladies and gentlemen who can spare the time to give service with their microscopes are invited to communicate with the hon. sec., Microscopical Department, Y.M.C.A., Tottenham Court Road, W.

SIR WILLIAM ASCROFT, a pioneer advocate of technical education, died on September 29, in his eighty-fifth year. He was president of the council of the Harris Institute, Preston, for more than thirty years (resigning in 1912), one of the original members of the council, and one of the trustees. The *Preston Guardian* remarks:—"Sir Wm. Ascroft's zeal for education, and particularly technical education, made the Harris Institute not only an incalculable benefit to Preston, but also one of the most influential pioneers of technical education in this country, setting an example which has been followed in many other centres. It was in recognition of his great services in this connection that his name was included in the list of Royal birthday honours in 1908."

IN the *South African Journal of Science* for June the Rev. S. S. Dorman deals with the question of the ruins at Zimbabwe and other sites in Rhodesia from the point of view of native tradition. He rejects the views advanced by Bent, Peters, and Hall that these buildings were erected by Semites, or under Semitic influence, from 2000 B.C. to A.D. 900. He has recorded the evidence of two intelligent natives, who allege that the buildings are of comparatively recent age, and that they were probably abandoned under pressure from marauding tribes. The so-called "temple" is now said to be only the residence of the chief, and the writer states that the buildings at Zimbabwe have not an appearance of antiquity, and that from the amount of weathering they do not appear to be more than 500 years old. He also produces evidence to show that gold mining was carried on by the natives at sites where these ruins do not exist, and he sums up by saying:—"As a large part of the Semitic theory of the origin of Zimbabwe and its associated ruins rests upon the ignorance of the natives of rock mining and the excessive antiquity of the mines, the bottom is absolutely knocked out of it by these and similar facts."

IN spite of the elaborate survey of Irish stone monuments by Mr. W. C. Borlase in his "Dolmens of Ireland," much remains to be done in that island, where dolmens, stone circles, alignments, and pillar-stones (inscribed, uninscribed, holed, and marked) are singularly abundant. In the June issue of the Journal of the Royal Society of Antiquaries of Ireland Mr. J. P. Condon publishes the first portion of a survey of the rude stone monuments of the northern portion of Cork County, in which he records many examples hitherto undescribed, and not even marked on the maps of the Ordnance Survey. At Greenhill a new ogham stone, with a fragmentary inscription, has been recently discovered; the Island group of monuments in the parish of Rahan forms a remarkable collection, and the stone circle at Lissard, in the parish of Grenagh, is fairly complete. On the whole, in this communication as many as eighty-five examples are described. This large collection from a small area shows the great abundance of these monuments, and the need for a complete survey of the whole of Ireland before these valuable antiquities are destroyed.

WITH the conception of the cancer problem as essentially a biological problem English readers have been familiar for many years, and Prof. L. Loeb's summary of the present position in the September number of the *Scientific Monthly* will be generally accepted. In several matters of detail, however, it is doubtful if his formulation of the problems will be useful. The attempt to separate the internal and external factors, as, for example, heredity and chronic irritation, disregards the fundamental truth that the influence of chronic irritation in the causation of cancer can only be conceived as acting through modification of the intracellular mechanism. It is a pity that the article does not distinguish between hypothetical views and generally accepted truths. An example of this is the statement that cancer of the mamma in mice cannot develop in the absence of a rhythmical repeated stimulus from the ovaries, although Loeb himself claims to have proved that the diminution of spontaneous mammary cancer in mice by castration can only be obtained if it is performed before sexual maturity. The contrast between spontaneous and transplanted cancer and the nature of immunity to the latter are well brought out. The paper ends with an attempt to combine the parasitic hypothesis of cancer etiology with the purely biological conceptions of its nature, mainly on the assumption that the explanation of the proliferation of cancer is to be found in analogies with the plant tumours caused by the *Bact. tumefaciens* and the bird tumours discovered by Peyton Rous to be due to a filtrable virus.

THE September issue of the *Journal of the Board of Agriculture* contains a useful summary of the results of co-operative experiments carried out in the years 1911–13, under the auspices of the Union of German Experiment Stations, with the view of obtaining further evidence as to the validity of the so-called "citric solubility" as a measure of the fertilising value of basic slag. The question is one which has aroused much controversy in recent years in Germany and also in this country, and has acquired considerable practical importance through the official recognition of the conventional Wagner method of determination of "citric solubility" in the Fertilisers and Feeding Stuffs Acts and regulations made thereunder. With one exception the reports from the five experiment stations co-operating in the tests are unanimous in upholding the validity of the Wagner test and justify the unanimous resolution of the Union of German Experiment Stations that there are no grounds for departing from the customary methods of evaluation of basic slag. It may be added that similar, though less comprehensive, tests carried out during the past three years at various centres in this country, under the auspices of the Agricultural Education Association, have also given results which in the main bear out this conclusion.

THE revised edition of Special Leaflet No. 46, recently issued by the Board of Agriculture and Fisheries, bears testimony to the vigorous criticism sustained from practical agriculturists since the first issue by reason of the advocacy in the leaflet of the application of sulphate of ammonia to the wheat crop during the autumn months. In view of this criticism it has been thought desirable to embody in the new issue a reasoned justification of the recommendation. It is admitted that on the average of years, if a dressing not exceeding, say, $\frac{3}{4}$ cwt. sulphate of ammonia is to be used, spring dressing may be expected to pay better than autumn dressing. It is argued, however, that with wheat high in price much heavier dressings can be profitably applied, that these must in any case be given in two or more instalments, and that the best result may be expected from them if a portion be applied in the autumn and the balance in the spring. It is further urged that the common fear of loss of soluble salts by leaching throughout the winter is largely groundless in the case of sulphate of ammonia, since the ammonia is firmly retained by the soil and is only readily removed by water after conversion to the form of nitrate. Such nitrification being the outcome of bacterial activity, little change of ammonia is likely to take place at the low temperatures obtaining in the soil during the winter months.

THE attention of teachers of geography should be directed to the fine illustrations which are a feature of the *National Geographic Magazine*, published in Washington. The magazine is ostensibly a popular publication, and fulfils its object of increasing and diffusing geographical knowledge. The issue for August, 1916 (vol. xxx., No. 2), contains, among others, articles on Sardinia, Argentine and Chile, and San Domingo and Hayti. The chief feature of each article is the illustrations, many of which have considerable geographical value, and all of which are admirably reproduced. It is not easy to get illustrations of the negro republic of Hayti, and those in this magazine give a vivid impression of the island and its chief towns. The people of the countries concerned are well illustrated in all the articles.

ON the Monthly Meteorological Chart of the North Atlantic and Mediterranean for October there appears the usual inset map of "phenomenal drifts and heights" of North Atlantic ice. We notice in this map a record, which has appeared in many previous issues, of ice, presumably an iceberg, recorded near the island of Colonsay, off the Firth of Lorne, in the west of Scotland. It was sighted by fishermen in July, 1902. It is a little difficult to credit this remarkable occurrence, and if the fishermen were not mistaken the iceberg would surely have been seen by other observers, but the chart makes no mention of this. There are conditions of sea and weather in which ice can easily be imagined, and this suggests one of those cases. Unless the record is established beyond all doubt, it would be well to query this occurrence or to remove its indication from the chart.

WE learn from the *Geographical Journal* for September that the Arkhangel Society for the study of the Russian North is taking steps to obtain information as to the fate of the two Russian polar expeditions, of which there has been no news for several years. Rusanoff's expedition in the *Hercules* visited Spitsbergen in the summer of 1912, and was last heard of the same year in Novaya Zemlya, on its way through the Matochin Shar to the Kara Sea. Ice conditions were exceptionally severe in Arctic seas in 1912. The other expedition, in the *St. Anna*, passed through Yugor Strait in September, 1912, with the intention of making the north-east passage. It was afterwards learnt that the *St. Anna* was abandoned in April, 1914, in 83° N., 63° E. Several Russian search expeditions have failed to reveal any further news. The Arkhangel Society is raising a fund of 250*l.* to be spent during the next three years in prizes for information throwing any light on the fate of the explorers. It is almost impossible that there can now be any survivors.

THE *Philippine Journal of Science* for January contains an interesting paper by G. W. Heise on the water supply of the city of Manila. The water is derived from the upper reaches of the Mariquina River, and the only physical purification it receives is storage in a reservoir for about three and a half days, which reduces the bacteriological count by about 90 per cent. The water is then treated with chloride of lime in doses varying from 0·5 to 0·75 part of available chlorine per million parts of water. This treatment appears to be still in a more or less experimental stage, and while, on the face of it, the sterilisation does not quite come up to expectations, some interesting results were obtained. Perhaps the most noteworthy of these is that the benefit derived from increasing the dose from 0·5 part of available chlorine per million to 0·625 part is very much greater than that derived by a further increase from the latter figure to 0·75 part. These results are chiefly judged by bacteriological counts made on the water before treatment and three-quarters of an hour after treatment. Possibly, if the results were judged on tests for *B. coli* done on various volumes of water (say 100 c.c., 10 c.c., 1 c.c., 0·1 c.c., etc.) instead of only on 2 c.c., and after longer contact (say three or four hours) of the water with the germicide, they would then wear a more favourable aspect, and at the same time give a truer estimate of the effect of the treatment.

UNDER the title "Mathematical Portraits and Pages" Messrs. Ginn and Co. have issued an attractive illustrated pamphlet of about twenty pages, drawn up by Prof. David Eugene Smith. The contents include reproductions of portraits of Newton, Isaac Barrow, John Wallis, Nicholas Saunderson, and Brook Taylor (of Taylor's theorem), also facsimiles of pages of "The Craft of Nombryng," Tonstall's "De Arte svppvtandi," Recorde's "Grovnd of Artes" and his "Whetstone of Witte," and the title-page of Digges and Son's "Stratioticos."

WHILE the late Captain Ferber was probably the first to consider lateral stability in applying the equations of rigid dynamics to the motions of aeroplanes, he unfortunately assumed that an aeroplane could be replaced by a system of three mutually orthogonal plane surface-elements, and it is greatly to be feared that the accident in which he lost his life may have arisen through the consequent misunderstanding of the problem. In the *Tôhoku Mathematical Journal*, ix., 4, Mr. Selig Brodetsky has now taken up the question as to how far it is possible, even on the simple "sine-law" hypothesis, to replace an aeroplane by three or more equivalent surfaces in three planes at right angles. The investigation leads to some exceedingly heavy algebra, which Mr. Brodetsky may claim to have worked out to the bitter end, with, briefly speaking, the following results:—(1) Except in the case of small divergences from a state of steady motion no such representation is possible; (2) in the case of small oscillations three planes are insufficient, but it is possible to represent the system by six surface-elements, namely, two in each of the three coordinate planes.

WHILE the claims of Napier as the discoverer of logarithms have received ample recognition in connection with the tercentenary celebration in 1914, it is interesting to notice that a system of logarithmic tables was invented and drawn up almost contemporaneously with Napier's work by Jost Bürgi, a Swiss. A brief note dealing with Bürgi's work is contributed to the *Mitteilungen der naturforschenden Gesellschaft in Bern* for 1914 (p. 318) by Dr. A. Bohren. Bürgi was born at Lichtenstein, in Toggenburg, about the year 1552, but of his early life little is known. He was originally a clockmaker by trade, but developed a talent for astronomical work, and, under the patronage at first of the Landgraf Wilhelm of Hesse, and later of Rudolf II. of Bohemia, he not only invented new astronomical instruments, but greatly assisted Kepler with his observations. His treatise on logarithmic methods described under the title "Arithmetical and Geometrical Progression-Tables" first saw the light in 1620, but it is certain that the tables were calculated and used by him long before that date, and their publication had been delayed by the war in Bohemia. Probably for the same reason the instructions which were to accompany the tables were never published, and in consequence they failed to come into general use. Both Bürgi and Napier built up their tables by forming successive positive integral powers of a number differing from unity by a very small decimal, but Bürgi's tables are based on the relations $x = 10n$, and $y = 10^8\ (1{\cdot}0001)^n$, while Napier calculated his logarithms from the successive powers of $1 - 10^{-7}$. It would thus appear probable that Bürgi was the first to use a base greater than unity, and so to obtain a scale more suitable for use with integral numbers. Whether Napier was acquainted with Bürgi's work is considered doubtful. Possibly Napier may have got the idea from Bürgi, and his choice of a system the base of which is less than unity may have been intended as an improvement to facilitate the use of the tables in trigonometry.

CIRCULAR No. 58 of the Bureau of Standards contains much valuable information as to the properties of invar and related nickel steels. Invar is a nickel steel containing about 36 per cent. of nickel, together with small amounts of carbon and manganese, and metallurgically negligible amounts of sulphur, phosphorus, and other elements. It melts sharply at about 1425° C. Above 200° C. to its melting point it may be considered to consist of a homogeneous solid solution of the above elements. Below 200° C., and at a temperature dependent on its history and exact composition, it undergoes a reversible transformation of such a nature that for any sample the transformation may be incomplete. This condition of thermochemical instability gives rise to both slowly and quickly changing values of its physical properties—changes which are particularly manifested in the expansion. It can be rolled, forged, turned, filed, and drawn into wires, and it takes a beautiful polish, giving an excellent surface on which fine lines may be ruled. It will withstand without spotting the corrosive action of water, even when immersed for several days. Its electrical resistivity is about eight times that of pure iron, and its temperature-coefficient of electrical resistance about 0·0012 per degree Centigrade. It is ferromagnetic, but becomes paramagnetic in the neighbourhood of 165° C. The mean coefficient of linear expansion between 0° and 40° C. is for ordinary invar of the order of one millionth, and samples have been prepared with even small negative coefficients; the amounts of carbon and manganese appear to exercise considerable influence on the expansion. Above 200° C. its expansion is nearly the same as that of ordinary Bessemer steel. It is subject to changes in length due to "after effects" following cooling from a high temperature, and even following slight alterations in temperature. A mathematical formula, $\Delta h/h = -0{\cdot}00325 \cdot 10^{-6}t^2$, holds for temperatures between 0° and 100° C.

THE results of the measurements of the rate of vaporisation of platinum vessels raised to high temperatures which have been made at the U.S. Bureau of Standards by Messrs. Burgess and Waltenberg are given in Scientific Paper No. 280, recently issued by the bureau. At temperatures below 900° C. there is no appreciable vaporisation, whatever be the composition of the platinum alloy of which the vessel is made. At 1000° C., however, the loss from 100 sq. cm. of a vessel of pure platinum is 0·08, and at 1200° C. 0·81 milligram per hour. For an alloy containing 1 per cent. iridium the corresponding rates are at 1000° C. 0·30, and at 1200° C. 1·2 milligrams per hour. For a 2·5 per cent. iridium alloy they are at 1000° C. 0·57, and at 1200° C. 2·5 milligrams per hour. Rhodium alloys, on the contrary, vaporise at lower rates. For an 8 per cent. rhodium alloy the rates of loss are at 1000° C. 0·07, and at 1200° C. 0·54 milligram per hour.

SINCE the appearance three years ago of the last edition of Prof. G. Lunge's "The Manufacture of Sulphuric Acid and Alkali," vol. i., many additions to the subjects treated of have been made. To deal with the new developments, Prof. Lunge has prepared a supplementary volume, which Messrs. Gurney and Jackson announce for publication this autumn.

MR. F. EDWARDS, of High Street, Marylebone, announces for early publication "The Fauna and Ethnology of New Guinea," being the official records of the collections formed by the British Ornithologists' Union Expedition, 1909–11, and the Wollaston Expedition, 1912–13, in Dutch New Guinea. The work will be in two volumes, and the edition limited to 150 copies.

OUR ASTRONOMICAL COLUMN.

THE ASTRONOMICAL COMPASS.—The utilisation of the heavenly bodies as a means of determining direction has attracted considerable attention since the outbreak of war, and various attempts to simplify the problem for general use have been made. Simplified azimuth tables, in conjunction with maps of the stars, have mostly been employed, but it is evident that such tables may be replaced by graphical projections of the circles of the celestial sphere. Under the title of the "Rev. William Hall's Visible Astronomical Compass," an arrangement for the direct solution of the chief problems depending upon the diurnal motion of the heavens has been published by Mr. J. D. Potter, 145 Minories, E.C. (price 1*s*. net, post free). A circle 6 in. in diameter, on a card 10 in. × 8 in., contains a stereographic projection on the plane of the horizon, for latitude 50° N., showing the circles of each even degree of declination, and hour circles at intervals of ten minutes. Circles of azimuth and altitude are not drawn, but the outer edge of the horizon circle is graduated for true bearings, and altitudes may be read off on a scale provided, after measurement with dividers along a travelling thread fixed at the zenith point. Given the time, or an approximate measurement of altitude, the bearing of any object is, of course, readily determined, and the "compass" can then be adjusted so as to show true directions. No new principle is involved, but the arrangement provides a stereographic projection in a convenient form, and the necessary instructions for its use are given. It should be understood, however, that a star map and an almanac are also requisite, and that some means of measuring altitudes would greatly extend the usefulness of the projection.